

# Printed sensors: from the printing process to the data acquisition system design

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Over the last years, the development of printed electronics has been growing rapidly. The main driving force has been the need for mass-production processes for the realization of very low cost devices. Typically, "Printed electronics" term refers to the use of different techniques such as screen printing, inkjet, or flexo/gravure. These are well-known technologies from graphics art industries that can also be used for the production of electronic components and devices such as OLEDs lamps, TFTs, RFID tags, antennas, displays, solar cells and sensors.

The printing processes allow a directed, reproducible (and therefore reliable) sensor application on a great variety of substrates, including paper and plastic and even on non-planar surfaces, reducing integration costs.

Due to major scientific and technologic efforts, printed sensors sensitive to temperature, touch, humidity, pressure, chemical compounds and light have already been achieved. In common, all of them are extremely flexible, lightweight and thin (few microns) being particularly suitable to be embedded in conventional products. Target applications include environmental monitoring (e.g. radiation tags), biomedical devices (e.g. disposable medical sensors), robotics (e.g. smart skin technology) and smart packaging (e.g. temperature tracking of pharmaceuticals, packaging designed to ensure the authenticity of branded products).<sup>[1]</sup>

At CeNTI we have been developing resistive and capacitive sensors printed by different techniques directly on different substrates (of different materials and morphologies) in close collaboration with industrial partners. A multi-disciplinary approach has been pursued focused in different steps that range from the optimization of the design and the deposition of sensors, the mechanical, morphologic and electrical characterization of the printed features and also the design and integration of the system for acquisition, treatment and data transmission. Due to the nature of the collaboration (which involves industrial partners), the scalability of the processes that are used is also one of the major focuses of the scientific and technological approaches.

## References

[1] <http://www.azom.com/article.aspx?ArticleID=5175>